Message

From: Bertram, Gary [Bertram.Gary@epa.gov]
Sent: 8/15/2016 6:13:09 PM
To: Ellis, Todd [todd.ellis@nebraska.gov]
CC: Terriquez, Joe [terriquez.joe@epa.gov]; Werner, Leslye [Werner.Leslye@epa.gov]
Subject: RE: Well Reads 08/10/16, 08/12/16

Todd – Typical hydrogen concentrations in landfill gas are less than 1%, but sometimes up to about 5%. The data shows three wells with hydrogen concentrations above 10%. All three show reduced methane concentrations (Well 25 not as drastic as 22 & 23) and very low CO concentrations. Typically, temperature, methane concentration and CO are pretty good indicators of a subsurface event. However, the following could explain the low CO concentrations.

"Operators should become nervous of a fast rise (ie ΔT) of greater than 3°C or when the temperature reaches 60°C. At 75°C the site is almost certainly on fire any unexpected changes in landfill gas analysis; both in concentration and relative proportions: i. changes in methane and carbon dioxide might indicate an imminent transition between the aerobic and anaerobic phases ii. changes in nitrogen possibly indicating that the oxygen in the air originally contained within the waste mass has been consumed leaving the original nitrogen content 'stranded' in the landfill iii. changes in hydrogen content might indicate a water-shift reaction where carbon monoxide and water react to form carbon dioxide and hydrogen (this occurs naturally in bog fires). iv. a change in carbon monoxide concentration might evidence incomplete combustion. Good benchmarking will help show how recently this took place." (https://waste-management-world.com/a/understanding-landfill-fires)

We've had the opportunity to observe data from burning landfill. The area with the subsurface event exhibits high temperature, low methane and elevated hydrogen. The areas where the subsurface event was not present provided "normal" data…methane 50 – 55%, temperatures below 131 F and trace – zero hydrogen. This is a limited dataset, but it does appear to indicate subsurface events may result in higher hydrogen concentrations. The Ohio EPA provides an reiterates the above statement to explain why high hydrogen and low CO may be an indication of a subsurface event (or pyrolysis event, as Butler County Landfill prefers to call it).

"Does the presence of hydrogen gas prove there is no subsurface landfill fire?
No. There are multiple sources of hydrogen gas within a landfill, from chemical reactions to biological processes. With respect to fires, hydrogen gas is produced during soot formation. In ideal conditions, the hydrogen and soot would break down into carbon dioxide and water. Due to very low levels of oxygen associated with a subsurface landfill fire, the combustion is incomplete allowing the hydrogen to escape. Consequently, an increase in hydrogen gas concentrations could be indicative of a subsurface landfill fire." (http://ohioepa.custhelp.com/app/answers/detail/a_id/2240/~/hydrogen-gas-and-subsurface-landfill-fires)

I revisited the data that you provided previously (as provided to you by the Butler County Landfill). The purpose of revisiting the data was to determine whether the subsurface event appears to be isolated of if it is spreading. I was unable to make any determination because I found very little data on well 25 in your previous e-mail messages. The only thing I found on well 25 was from 5/5/16 readings. Everything looks fairly normal…but there was no flow data.

First, I would be concerned with the high hydrogen levels. Second, I'd be curious about well 25. Data for well 25 could show potential movement of the subsurface event.

Take Care,

Gary Bertram
U.S. EPA - Region 7
11201 Renner Blvd
Lenexa, KS 66219

913-551-7533

From: Ellis, Todd [mailto:todd.ellis@nebraska.gov]
Sent: Monday, August 15, 2016 9:58 AM
To: Bertram, Gary <Bertram.Gary@epa.gov>
Subject: FW: Well Reads 08/10/16, 08/12/16

Gary,

Here are the results of their canister samples from Butler county. Very hi Hydrogen. What does that mean?

Todd

From: Geoff Strack [mailto:GeoffS@WasteConnections.com]
Sent: Monday, August 15, 2016 8:58 AM
To: Ellis, Todd; Kelly Danielson; Gidley, Bill; Leibrandt, Morgan; Prenosil, Erik; Franz, Ron; 'Stutz, Matt'
Cc: David Payne
Subject: RE: Well Reads 08/10/16, 08/12/16

Todd,

Attached is the summary memo from Weaver and the raw data. If you would like to discuss these results further, we can schedule a conference call next week when Matt returns from vacation.

Geoff Strack, P.E.
Waste Connections.

From: Ellis, Todd [mailto:todd.ellis@nebraska.gov]
Sent: Monday, August 15, 2016 6:50 AM
To: Kelly Danielson; Gidley, Bill; Leibrandt, Morgan; Prenosil, Erik; Franz, Ron; 'Stutz, Matt'
Cc: Geoff Strack; David Payne
Subject: RE: Well Reads 08/10/16, 08/12/16

Kelly,

Do you have the canister results yet? They surly have been analyzed by now or the holding times would be shot.

Todd

From: Kelly Danielson [mailto:KellyD@WasteConnections.com]
Sent: Friday, August 12, 2016 4:41 PM
To: Gidley, Bill; Leibrandt, Morgan; Ellis, Todd; Prenosil, Erik; Franz, Ron; 'Stutz, Matt'

Cc: Geoff Strack; David Payne
Subject: FW: Well Reads 08/10/16, 08/12/16

Well reads from 8/10 and 8/12

From: David Payne
Sent: Friday, August 12, 2016 4:39 PM
To: Kelly Danielson
Subject: FW: Well Reads 08/10/16, 08/12/16

Here are the well reads for Butler for this week.

From: Ryan Nelson [mailto:Ryan.Nelson@ariaenergy.com]
Sent: Friday, August 12, 2016 4:11 PM
To: David Payne
Subject: Well Reads

Ryan Nelson
Aria Energy
3580 R Road
David City, NE 68632
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